Claims

1. An electric power generating unit comprising

(i) an ammonia storage device in the form of a container comprising an ammonia absorbing and releasing salt of the general formula: $M_a(NH_3)_nX_z$, wherein M is one or more cations selected from alkali metals, alkaline earth metals, and transition metals such as Li, Na, K, Cs, Mg, Ca, V, Cr, Mn, Fe, Co, Ni, Cu, or Zn or combinations thereof such as NaAl, KAl, K_2Zn, CsCu, or K_2Fe, X is one or more anions selected from fluoride, chloride, bromide, iodide, nitrate, thiocyanate, sulphate, molybdate, and phosphate ions, a is the number of cations per salt molecule, z is the number of anions per salt molecule, and n is the coordination number of 2 to 12,

(ii) means for heating said container and ammonia absorbing and releasing salt for releasing ammonia gas and

(iiia) a fuel cell for converting ammonia directly into electric power; or

(iiib1) a reactor for dissociating ammonia into hydrogen and nitrogen and

(iiib2) a fuel cell for converting hydrogen into electric power.

2. The electric power generating unit according to claim 1 further comprising means for adding ammonia to saturate the ammonia absorbing and releasing salt with ammonia.

3. The electric power generating unit according to claim 1, wherein said ammonia absorbing and releasing salt is $Mg(NH_3)_6Cl_2$.

4. The electric power generating unit according to any of claims 1-3, where the salt is in the form of a fine powder of micro crystals or located on a porous support material.

5. The electric power generating unit according to any of claims 1-3, where the means for heating is in the form of an electrical resistive heating device.

6. The electric power generating unit according to any of claims 1-3, where said means for heating is provided by a heat produced by chemical reactions.

7. The electric power generating unit according to claim 1 where the container and means for heating are a part of a micro-size electric system being micro fabricated using processes such as mechanical grinding, chemical vapour deposition (CVD), plasma enhanced chemical vapour deposition (PECVD), electron cyclotron resonance (ECR), sputtering, etching, lithographic methods such as electron beam lithography, photo lithography, or laser lithography.

8. The power generating unit according to claim 1 where the reactor for dissociating ammonia contains a heterogeneous catalyst.

9. The power generating unit according to claims 8 where said heterogeneous catalyst comprises a support and an active phase.

10. The power generating unit according to claims 9 where said active phase comprises dispersed nanoparticles of transition metals or compounds thereof such as Co_3Mo_3N, Ru, Co, Ni and Fe or mixtures thereof.

11. The power generating unit according to any of claims 1-10 further comprising a combustion device wherein a part of the hydrogen produced in the reactor, unreacted hydrogen from the fuel cell or a mixture thereof is oxidized for providing heat for heating the ammonia storage device.

12. The power generating unit according to any of claims 1-10 further comprising a combustion device wherein a fraction of the hydrogen produced in the reactor, unreacted hydrogen from the fuel cell or a mixture thereof is oxidized for providing heat for heating said reactor for dissociating ammonia.

13. The power generating unit according to any of claims 1-10 further comprising a combustion device wherein a fraction of the ammonia released from the ammonia storage, unreacted ammonia from the fuel cell or a mixture thereof is oxidized for providing heat for heating said ammonia storage device.

14. The power generating unit according to any of claims 1-10 further comprising a combustion device wherein a fraction of the ammonia released from the ammonia storage, unreacted ammonia from the fuel cell or a mixture thereof is oxidized for providing heat for heating said reactor for dissociating ammonia.

15. The power generating unit according to claims 1-14 where the constituents thereof are dimensioned to provide full balancing of the complete unit.

16. The power generating unit according to any of claims 1-14 in the form of a micro-size power source for microelectronic devices or micro-electro-mechanical-systems (MEMS).

17. The power generating unit according to claim 1 where said reactor for dissociating ammonia is a part of a micro-size electric system being micro fabricated using processes such as mechanical grinding, chemical vapour deposition (CVD), plasma enhanced chemical vapour deposition (PECVD), electron cyclotron resonance (ECR), sputtering , etching, lithographic methods such as electron beam lithography, photo lithography, or laser lithography.

18. The power generating unit according to any of claims 1-10 where the reactor for dissociating ammonia is divided into two parts, one part operated at a low temperature that dissociates most ammonia and another part operated at a high temperature that dissociates the last present fraction of ammonia.

19. The use of an ammonia storage device in the form of a container comprising an ammonia absorbing and releasing salt of the general formula: $M_a(NH_3)_nX_z$, wherein M is one or more cations selected from alkali metals, alkaline earth metals, and transition metals such as Li, Na, K, Cs, Mg, Ca, V, Cr, Mn, Fe, Co, Ni, Cu, or Zn or combinations thereof such as NaAl, KAl, K_2Zn, CsCu, or K_2Fe, X is one or more anions selected from fluoride, chloride, bromide, iodide, nitrate, thiocyanate, sulphate, molybdate, phosphate, and chlorate ions, a is the number of cations per salt molecule, z is the number of anions per salt molecule, and n is the coordination number of 2 to 12 as a source of energy in a electric power generating unit comprising

(1) means for heating said container and ammonia absorbing and releasing salt for releasing ammonia gas,

(2a) a fuel cell for converting ammonia directly into electric power; or comprising

(2b1) a reactor for dissociating ammonia into hydrogen and nitrogen and

(2b2) a fuel cell for converting hydrogen into electric power.

20. The use according to claim 19 wherein the electric power generating unit according further comprises means for adding ammonia to saturate the ammonia absorbing and releasing salt with ammonia.